

Safety of Autologous Stem Cell Treatment for Traumatic Brain Injury in Children

This study is currently recruiting participants.

Verified by The University of Texas Health Science Center, Houston, June 2008

Sponsored by:	The University of Texas Health Science Center, Houston
Information provided by:	The University of Texas Health Science Center, Houston
ClinicalTrials.gov Identifier:	NCT00254722

▶ Purpose

The purpose of this study is to determine if bone marrow progenitor cell (BMPC) autologous transplantation in children after isolated traumatic **brain** injury is safe and will improve functional outcome.

<u>Condition</u>	<u>Intervention</u>	<u>Phase</u>
Traumatic Brain Injury	Procedure: Autologous bone marrow precursor cell harvest and transplant	Phase I

Study Type: Interventional

Study Design: Treatment, Non-Randomized, Open Label, Historical Control, Single Group Assignment, Safety Study

Official Title: Safety of Autologous Stem Cell Treatment for Traumatic **Brain** Injury in Children

Further study details as provided by The University of Texas Health Science Center, Houston:

Primary Outcome Measures:

- neurologic events [seizures, change in Glasgow coma scale (GCS), **cerebral** vascular accident (CVA)] [Time Frame: 12 hours post cellular product infusion, up to 21 days post infusion]
[Designated as safety issue: Yes]
- infectious morbidity [Time Frame: up to 21 days post cellular product infusion]
[Designated as safety issue: Yes]
- secondary organ injury [Time Frame: up to 21 days post cellular product infusion]
[Designated as safety issue: Yes]

Estimated Enrollment: 10
 Study Start Date: April 2006
 Estimated Study Completion Date: December 2009
 Estimated Primary Completion Date: December 2008 (Final data collection date for primary outcome measure)

<u>Arms</u>	<u>Assigned Interventions</u>
I: Experimental single arm study	Procedure: Autologous bone marrow precursor cell harvest and transplant Bone marrow harvest (3 ml/kg of body weight) performed between 12 and 30 hours post injury, followed by single intravenous infusion of bone marrow progenitor cells - target dose is 6×10^6 mononuclear cells/kg body weight, administered within 36 hours of injury

Detailed Description:

Traumatic brain injury (TBI) contributes to 50% of all trauma deaths. The mortality rate for children following severe TBI (Glasgow Coma Scale < 9) ranges from 14-24%. There is currently no therapy to reverse the primary injury associated with TBI. Bone marrow precursor cells (BMPC) or bone marrow mononuclear cellular fractions of bone marrow contain mesenchymal stem cells (MSC) and hematopoietic stem cells (HSC). These cells are a component of bone marrow that preferentially migrate to the site of brain injury and differentiate into neurons and cell supporting elements, improving functional outcome in animals. The primary objective of this study is to determine if BMPC harvest and autologous transplantation is safe in children after TBI. The secondary objective is to determine if late functional outcome is improved with BMPC autologous transplantation compared to age and severity matched concomitant controls. Safety will be determined by monitoring cerebral and systemic hemodynamics during harvest and transplantation, neurologic events (seizure, change in GCS, stroke), local site inflammation/injury, and secondary organ injury. Late outcomes will be determined using age-corrected Glasgow Outcome Scores, and a battery of functional outcome measures. In vitro, an aliquot of cells harvested from patients will be studied for labeling with magnetodendrimers as a feasibility study, and these cells will not be reinfused into the patients. The primary endpoint is to assess the safety of autologous BMPC harvest/transplantation in the acute injury phase (hospital stay) and the secondary endpoint is to assess efficacy through 1 and 6 month post-injury follow-up. The rationale for the use of autologous BMPC transplantation is based on a large volume of in vitro and in vivo animal data (see background and significance section). The rationale for using children as the primary population is that children have a greater neurologic plasticity with a unique injury pattern when compared to adults. Children are more likely to have isolated TBI that is more diffuse and less likely to be secondary to extra-axial fluid collections. Patients aged 5-14 years old with GCS of 5-8 will be considered for enrollment into the study. Within 24-36 hours of injury, enrolled patients will undergo bone marrow harvest/BMPC separation and re-infusion. Daily monitoring of the safety outcomes measures and long term neurologic outcomes will be performed. This study should determine if bone marrow harvest, BMPC separation, and reinfusion is safe in children after severe TBI.

▶ Eligibility

Ages Eligible for Study: 5 Years to 14 Years

Genders Eligible for Study: Both

Accepts Healthy Volunteers: No

Criteria

Inclusion Criteria:

1. Between 5 and 14 years of age on the day of injury
2. Hospital admission Glasgow coma score between 5 and 8
3. Initial injury occurring less than 24 hours prior to consent

Exclusion Criteria:

1. Known history of:
 - Previous brain injury
 - Developmental delay
 - Neurologic impairment and/or deficit
 - Seizure disorder requiring anti-convulsant therapy
 - Renal disease or altered renal function as defined by serum creatinine > 1.5 mg/dL at admission
 - Hepatic disease or altered liver function as defined by SGPT > 150 U/L, and/or T. bilirubin > 1.3 mg/dL at admission
 - Cancer or HIV
 - Immunosuppression as defined by WBC < 3 (10x3) at admission
2. Obliteration of perimesencephalic cistern on initial head CT/MRI suggesting prolonged hypoxic ischemic insult
3. Initial hospital ICP > 40
4. Hemodynamic instability at the time of consent defined as ongoing fluid resuscitation and/or requirement for inotropic support to maintain MAP at or above normals for age - does not include CPP based inotropic support
5. Uncorrected coagulopathy at the time of consent defined as INR > 1.4; PTT > 35 sec; PLT < 100,000; fibrinogen < 100 g/dL
6. Unstable pelvic fractures defined as requiring operative fixation to manage
7. Pulmonary contusions defined as a chest x-ray with non-anatomic opacification and/or PaO₂:FIO₂ ratio < 250 associated with the mechanism or injury
8. Solid or hollow visceral injury of the abdomen and/or pelvis as diagnosed by CT or other imaging
9. Spinal cord injury as diagnosed by CT or MR imaging or by clinical findings.
10. Persistent hypoxia defined as SaO₂ < 94% for > 30 minutes occurring at any time from hospital admission to time of consent
11. Positive urine pregnancy test
12. Participation in an intervention study
13. Unwillingness to return for follow-up visits

▶ **Contacts and Locations**

Please refer to this study by its ClinicalTrials.gov identifier: NCT00254722

Contacts

Contact: Charles S. **Cox**, Jr., M.D. 713-500-7307 charles.s.cox@uth.tmc.edu

Contact: Mary-Clare Day, R.N., B.S.N. 713-500-7329 mary-clare.day@uth.tmc.edu

Locations

United States, Texas

UT-**Houston** Pediatric Surgery & Memorial Hermann Children's Hospital **Recruiting**

Houston, Texas, United States, 77030

Contact: Charles S. **Cox**, Jr., M.D. 713-500-7307 charles.s.cox@uth.tmc.edu

Contact: Mary-Clare Day, RN, BSN 713-500-7329 mary-clare.day@uth.tmc.edu

Principal Investigator: Charles S. **Cox**, Jr., M.D.

Principal Investigator: James E. Baumgartner, M.D.

Sub-Investigator: Linda Ewing-Cobbs, Ph.D.

Sub-Investigator: Laura Worth, M.D.

Sponsors and Collaborators

The University of Texas Health Science Center, Houston

Investigators

Principal Investigator: Charles S. **Cox**, Jr., M.D. The University of Texas Health Science Center,
Houston

More Information

Responsible Party: University of Texas Medical School at Houston (Charles S. Cox, Jr. M.D.)
Study ID Numbers: HSC-MS-05-0004, 1R21HD042659-01A1
First Received: November 14, 2005
Last Updated: September 11, 2008
ClinicalTrials.gov Identifier: [NCT00254722](https://clinicaltrials.gov/ct2/show/study/NCT00254722)
Health Authority: United States: Food and Drug Administration

[U.S. National Library of Medicine](#), [Contact Help Desk](#)
[U.S. National Institutes of Health](#), [U.S. Department of Health & Human Services](#),
[USA.gov](#), [Copyright](#), [Privacy](#), [Accessibility](#), [Freedom of Information Act](#)

